

## **8.15 FIRE PROTECTION FOR HEPA FILTER SYSTEMS**

### **8.15.1 PURPOSE**

This section establishes the requirements for the installation and use of high-efficiency particulate air (HEPA) filters and equipment at LaRC.

### **8.15.2 SCOPE**

This section shall apply to the installation and use of new permanent HEPA filters and equipment at LaRC as well as change outs made to permanent systems. These requirements do not apply to portable HEPA filtration systems used on a temporary basis.

### **8.15.3 REQUIREMENTS**

#### **8.15.3.1 Atmosphere Filtration**

Air and inert gas shall enter each ventilated area through at least one fire resistant HEPA filter and shall be discharged through at least one fire resistant prefilter and one fire resistant HEPA filter to exhaust ductwork leading to a final filter system.

#### **8.15.3.2 Ventilation System Fire Protection**

The ventilation system shall be designed to withstand any credible fire or explosion and shall continue to act as a confinement barrier. Fire protection features of ventilation systems shall include fire resistant materials of construction, fire resistant filters, heat and smoke detectors, alarms, heat removal devices, fire suppression equipment, and fire doors and dampers or other proven devices to restrict the spread of fires.

Design of the system shall include an analysis to determine if the ventilation system is capable of operating under design basis fire conditions as specified in the design criteria. HEPA filtration systems serving as a final means of effluent cleaning shall have at least two stages of fire resistant filters in series in a filter plenum. If it can be determined that the filters can be subjected to sufficient heat to cause failure, the final filters shall be protected by heat removal or sprinkler systems that automatically activate at a preset temperature. If a heat removal system is deemed necessary, an inlet baffle and a spark arrestor and demister shall precede the first stage of filters. If a cooling spray is used for heat removal, it shall be followed by a combination spark arrestor/demister screen to remove entrained droplets. A roughing filter shall be mounted behind these components to remove the bulk of the draft-carried debris.

The cooling spray system shall operate automatically upon abnormal temperature increase indicated by detectors in the exhaust ducts feeding the cool chamber inlet. A manually operated valve actuating the spray system also shall be provided as a backup.

#### **8.15.3.3 Instrumentation**

Ventilation systems shall be provided with instrumentation to read out and alarm in one or more central control areas. These areas shall be designed to permit occupancy and the ability to operate ventilation systems safely during normal and abnormal conditions. The instrumentation system shall provide the following:

1. Readout from appropriate surveillance instrumentation for all essential functions of the ventilation systems.
2. Visual and/or audible alarms for significant abnormal conditions, such as filter plugging or breakthrough, low airflow or reversal, fire protection system activation, high stack and effluent activity.
3. For normal or abnormal conditions, where combustible solvents, gases, and vapors could possibly be present in a ventilation system, continuous monitoring systems suitable for monitoring such substances shall be included in the design, with readout normally in the control room. The ventilation system shall be designed with flow rates or other features to preclude the possibility of an explosion, as evaluated in the safety analysis document.
4. All HEPA filters shall be equipped with differential pressure instrumentation.

#### 8.15.4 RESPONSIBILITIES

Facility Coordinator and/or Facility Safety Head shall ensure that practices delineated in this section are followed and contact the LaRC Fire Chief prior to installation of new filter and plenum equipment or modification of existing filter and plenum equipment.

LaRC Fire Chief shall evaluate locations requested for the installation of new filter and plenum equipment or modifications of existing filter and plenum equipment.

### 8.16 FIRE PROTECTION FOR HAZARDOUS MATERIALS STORAGE

#### 8.16.1 PURPOSE

This section establishes the requirements for the storage, handling, and use of hazardous materials at LaRC. Hazardous materials are defined by Section F-2303 of the BOCA National Fire Prevention code and can include flammable and combustible liquids, gases, corrosives, oxidizers, water reactive chemicals, and radioactive materials.

#### 8.16.2 SCOPE

This section shall apply to the handling and storage of hazardous materials at LaRC.

#### 8.16.3 REQUIREMENTS

##### 8.16.3.1 Design

Hazardous material storage shall be separated by minimum distances from other facilities and personnel areas in accordance with the appropriate standard.

Incompatible hazardous materials stored outside of facilities shall be separated from one another by minimum distances as specified in the appropriate standard. Hazardous materials that may cause environmental damage in the event of fire shall be located in separate hazardous material containment buildings or tanks.

Hazardous material storage areas and buildings shall be provided with containment for liquid runoff control.